

LA-UR-83-955

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DE83 009907

CONF-830311--63

Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36

TITLE. MONITOR 1983

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SUBMITTED TO 1983 Particle Accelerator Conference, Santa Fe, NM,  
March 21-23, 1983.

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## MONITOR 1983

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### Summary

The Monitor remote handling system was especially developed to perform "in situ" remote maintenance operations on Line A at the Clinton P. Anderson Meson Facility (LAMPF). Previous papers have traced the development of the system from prototype unit thru the more sophisticated "Monitor I" and "Monitor II" systems now in use.

The "Monitor I" and "Monitor II" systems have served well in performing all necessary maintenance; however, future major improvements and expansion of experimental facilities call for development of a third system.

Monitor III is a more portable system which will be able to support major disassembly and reconstruction of facilities remote from Line A. The system will include a large trailer mounted cask for safe transport of obsolete radioactive beam line components to the disposal site.

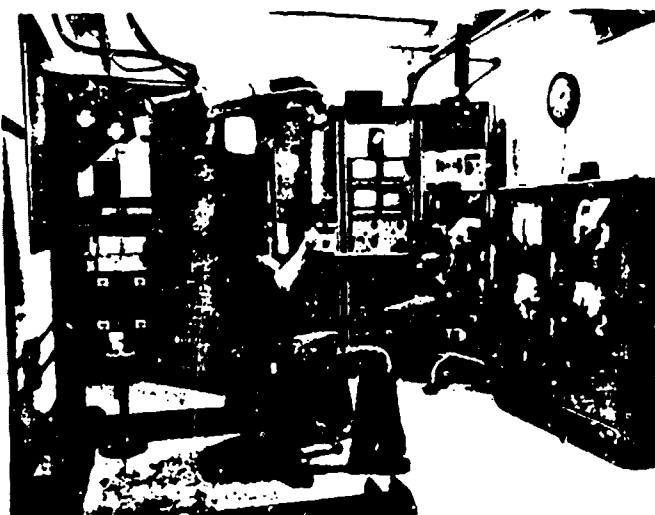


Figure 2 - Monitor Master Control Console,  
1981 Version.



Figure 1 - Monitor Master Control Console,  
1983 Version

### "Monitor I" and "Monitor II"

These systems have performed so well that no major changes have been made since 1981. Recent improvements have been limited to improving electrical hardware and updating controls and operating consoles. Figure 1 is a photograph of the latest control console layout. For comparison, Figure 2 is a photograph of the 1981 version.

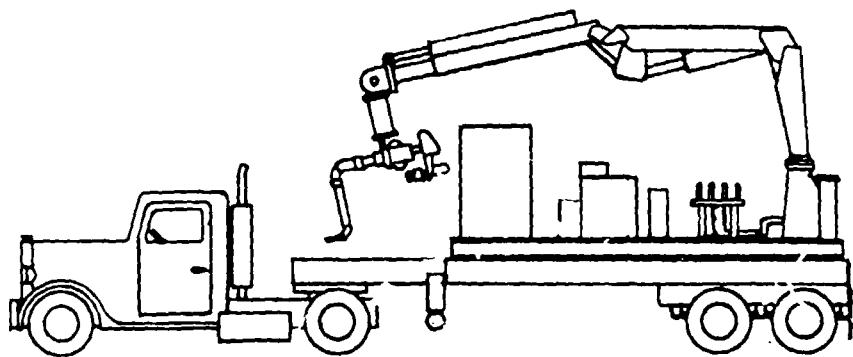
### "Monitor III"

Monitor III is a portable system which can operate at any location accessible by truck. Electrical power is furnished by a portable diesel powered generator. Figure 3 shows conceptual sketches of the Monitor III equipment. Monitor III will have the capability to augment any heavy equipment necessary for making major facility modifications which are beyond the coverage of the present Monitor I and Monitor II systems.

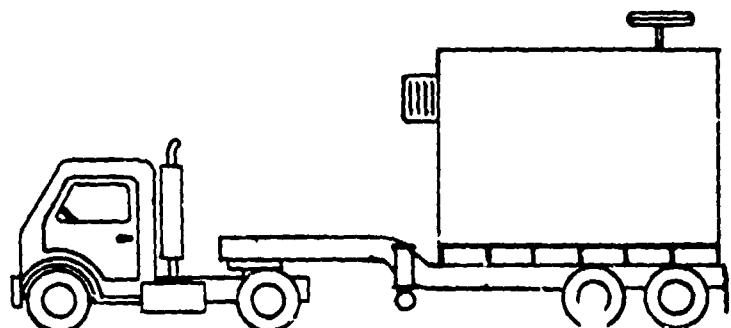
The first task planned for Monitor III will be to assist Monitor I and Monitor II in rebuilding LAMPF target cell A-1. The scope of work includes: removal and interim storage of large radioactive structural members, and shield blocks; removal, transport and disposal of many large beam line components. Typical weights and activity levels for the components are 16 metric tons and 3000 R/HR. All items to be disposed of will be transported to the disposal site (~4.5 km via public roads) in the cask trailer. At the disposal site (remote area, no services), the Monitor III master/slave units will perform remote rigging operations for a motor crane which will transfer the material from the cask to the disposal shaft. The crane operator will be directed by video and/or voice communication from the master control station.

Other short term tasks for Monitor III include major rebuilding of the beam stop area (LAMPF cell A-6) and stand-by assistance for facility construction projects which may involve excavation of contaminated earth and/or removal of activated building materials.

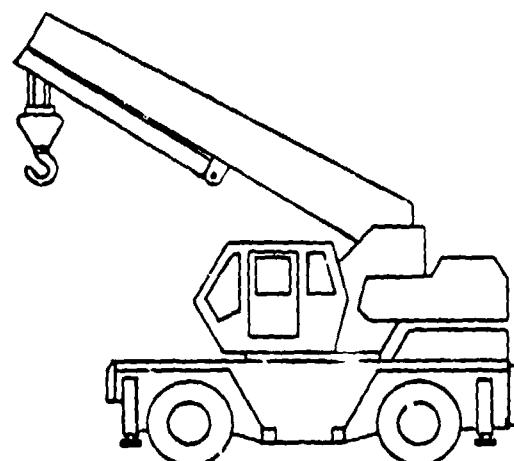
Although it would be possible to perform the major rebuilding operations at LAMPF without Monitor III, such major modifications would not be practical from the standpoint of cost and time schedules.



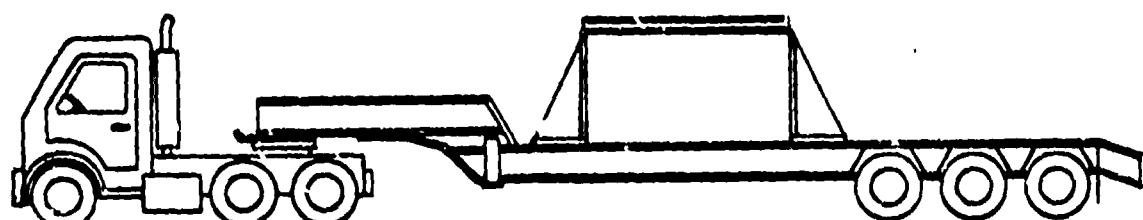
a. SLAVE UNIT



b. MASTER CONTROL STATION



c. MOTOR CRANE



d. CASK TRAILER

FIGURE 3  
MONITOR III REMOTE HANDLING SYSTEM

The Monitor III system is scheduled to become fully operational by Nov., 1983. The cask trailer is complete and is presently supporting major modifications to LAMPF target cell A-2. The use of the Monitor III cask trailer has reduced radiation exposures during disposal operations by a factor of  $\sim 5$ . It is anticipated that personnel exposure during disposal operations will be reduced to nearly zero when the complete system becomes operational. Figure 4 is a photograph of the Monitor III cask trailer. Figure 5 is a photograph of the master control station.

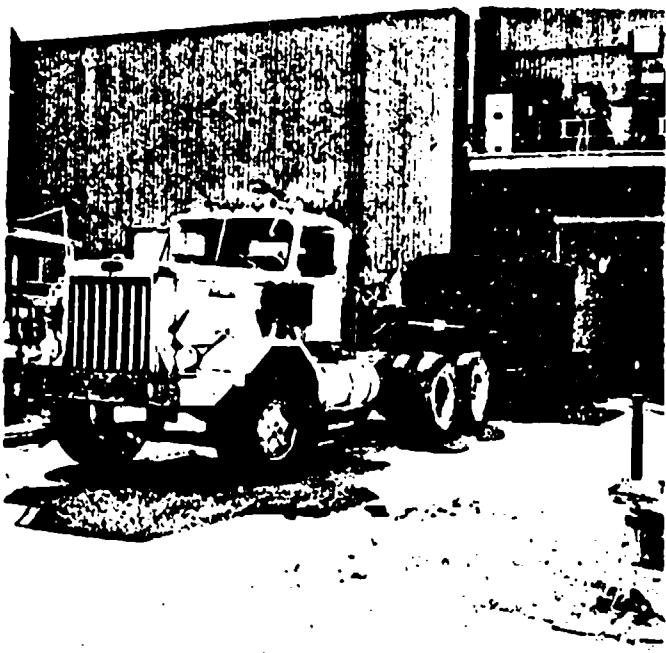


Figure 4 - Monitor III Cask Trailer

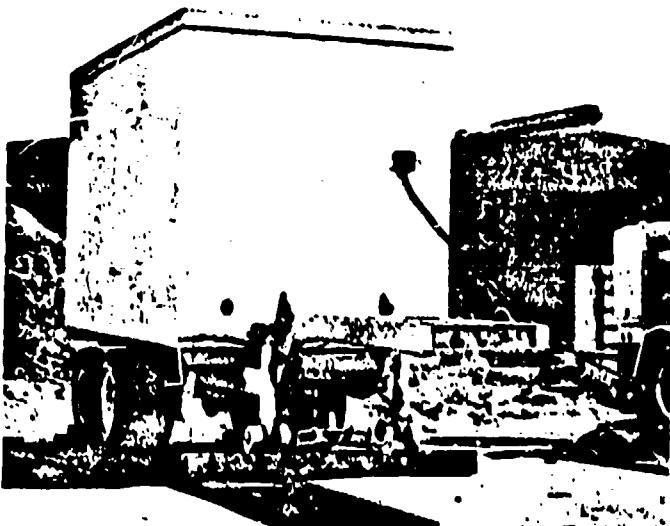


Figure 5 - Monitor III Master Control Station

#### Conclusion

The Monitor III system will facilitate major improvement of LAMPF experimental facilities which would not be practical with the present systems alone. In addition to specific needs at LAMPF, Monitor III represents a major milestone in the development of a workable portable remote handling system capable of reacting to emergency needs on a national or worldwide basis.

#### References

1. D. L. Grisham, J. E. Lambert, T. S. Baldwin and E. L. Ekberg, "Monitor 1981," IEEE Trans., Nucl. Sci. NS-28, e, 3007 (1981).
2. J. E. Lambert, D. L. Grisham, "History of Remote Handling at LAMPF," Trans. Am. Nucl. Soc. 41, 628 (1982).